IN THE CLAIMS

The following is a complete list of the claims now pending; this listing replaces all earlier versions and listings of the claims.

Claim 1 (currently amended): A method of interpolating a first set of discrete sample values to generate a second set of discrete sample values using one of a plurality of interpolation kernels, said method comprising the steps of:

identifying text ~~and edge~~ regions in the first set of discrete sample values depending on ~~an edge strength indicator, an edge direction indicator and~~ a local contrast indicator for each of the discrete sample values of the first set;

identifying edge regions in the first set of discrete sample values depending on an edge strength indicator and an edge direction indicator for each of the discrete sample values of the first set;

combining the text regions and the edge regions to form a kernel selection map;

cleaning the kernel selection map by ~~re-orientating the~~ re-assigning orientations of any edge regions having isolated edge directions occurring in an otherwise uniformly directed local region of the first set of discrete sample values, according to ~~an underlying edge~~ the uniform direction; and

selecting the interpolation kernel using the cleaned kernel selection map for use in interpolating the first set of discrete sample values to generate the second set of discrete sample values.

Claim 2 (previously presented): The method according to claim 1, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 3 (previously presented): The method according to claim 1, wherein the plurality of kernels are given by:

$$h(s_x, s_y)_{0 \le \theta \le \pi/2} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi)s_x + (2\theta/\pi-1)s_y)w(\theta))_{c=0}\right\}$$

$$h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi-1)s_x + (2\theta/\pi-2)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi-2)s_x + (1-2\theta/\pi)s_y)w(\theta))_{c=0}\right\}$$

,

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and $\cdot$ indicates matrix multiplication.

Claim 4 (previously presented): The method according to claim 1, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, & -d < |s| \le d \\ 0, & (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, & \end{cases}$$

$$h(s_x, s_y)_{\theta=o} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein h(s) is a modified cubic kernel, $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 5 (previously presented): The method according to claim 1, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claim 6 (canceled)

Claim 7 (previously presented): The method according to claim 1, wherein one or more of the indicators are processed using a morphological process.

Claims 8 and 9 (canceled)

Claim 10. (Currently Amended) A method of interpolating image data, said method comprising the steps of:

accessing a first set of discrete sample values of the image data;

identifying text ~~and edge~~ regions in the first set of discrete sample values depending on ~~an edge strength indicator, an edge direction indicator and~~ a local contrast indicator associated with each of the discrete sample values of the first set;

identifying edge regions in the first set of discrete sample values depending on an edge strength indicator and an edge direction indicator for each of the discrete sample values of the first set;

combining the text regions and the edge regions to form a kernel selection map;

cleaning the kernel selection map by ~~re-orientating the~~ re-assigning orientations, of any edge regions having isolated edge directions occurring in an otherwise uniformly directed local region of the first set of discrete sample values, according to the uniform ~~an underlying edge~~ direction;

calculating kernel values for each of the discrete sample values using one of a plurality of kernels, wherein the one kernel is selected from the plurality of kernels using the cleaned kernel selection map; and

convolving the kernel values with the discrete sample values to provide a second set of discrete sample values.

Claim 11 (previously presented): The method according to claim 10, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 12 (previously presented): The method according to claim 10, wherein the plurality of kernels are given by:

$$h(s_x, s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h((1-2\theta/\pi)s_x + (2\theta/\pi)s_y)_{c=0.5} \cdot h(((2\theta/\pi)s_x + (2\theta/\pi-1)s_y)w(\theta))_{c=0}\right\}$$

$$h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi-1)s_x + (2\theta/\pi-2)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi-2)s_x + (1-2\theta/\pi)s_y)w(\theta))_{c=0}\right\},$$

and wherein h(s) is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 13 (previously presented): The method according to claim 10, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2-\frac{3}{2}b-c)|s|^3 + (-3+2b+c)|s|^2 + (1-\frac{1}{3}b), & |s|\le 1 \\ (-\frac{1}{6}b-c)|s|^3 + (b+5c)|s|^2 + (-2b-8c)|s| + (\frac{4}{3}b+4c), & 1<|s|\le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, - d < s \leq d \\ 0, (1 - d) \geq s > (1 - d) \\ 2\left|\frac{s - d}{1 - 2d}\right|^3 - 3\left|\frac{s - d}{1 - 2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=0} = \frac{1}{\sqrt{2}}\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\}$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein *h(s)* is a modified cubic kernel, $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 14 (previously presented): The method according to claim 10, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claim 15. (Currently Amended) An apparatus for interpolating image data, said apparatus comprising:

means for accessing a first set of discrete sample values of the image data;

text identifying means for identifying text ~~and edge~~ regions in the first set of discrete sample values depending on ~~an edge strength indicator, an edge direction indicator and~~ a local contrast indicator associated with each of the discrete sample values of the first set;

edge region identifying means for identifying edge regions in the first set of discrete sample values depending on an edge strength indicator and an edge direction indicator for each of the discrete sample values of the first set;

kernel selection map means for combining said text regions and said edge regions to form a kernel selection map;

cleaning means for cleaning the kernel selection map by ~~re-orientating~~ re-assigning orientations of any ~~the~~ edge regions having isolated edge directions occurring in an otherwise uniformly directed local region of the first set of discrete sample values, according to ~~an underlying edge direction~~ the uniform direction;

calculator means for calculating kernel values for each of the discrete sample values using one of a plurality of kernels, wherein the one kernel is selected from the plurality of kernels using the cleaned kernel selection map; and

convolution means for convolving the kernel values with the discrete sample values to provide a second set of discrete sample values.

Claim 16 (previously presented): The apparatus according to claim 15, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 17 (previously presented): The apparatus according to claim 15, wherein the plurality of kernels are given by:

$$h(s_x, s_y)_{0\leq\theta\leq\pi/2} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi)s_x + (2\theta/\pi-1)s_y)w(\theta))_{c=0}\right\}$$

$$h(s_x, s_y)_{0\leq\theta\leq\pi/2} = \frac{1}{\sqrt{2}}\left\{h((2\theta/\pi-1)s_x + (2\theta/\pi-2)s_y)_{c=0.5} \cdot h(((2\theta/\pi-2)s_x + (1-2\theta/\pi)s_y)w(\theta))_{c=0}\right\}$$

,

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 18 (previously presented): The apparatus according to claim 15, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2-\frac{3}{2}b-c)|s|^3 + (-3+2b+c)|s|^2 + (1-\frac{1}{3}b), & |s| \leq 1 \\ (-\frac{1}{6}b-c)|s|^3 + (b+5c)|s|^2 + (-2b-8c)|s| + (\frac{4}{3}b+4c), & 1 < |s| \leq 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\dfrac{s-d}{1-2d}\right|^3 - 3\left|\dfrac{s-d}{1-2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=o} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x+s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x-s_y}{\sqrt{2}}\right)_{c=0}\right\},$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x+s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x-s_y}{2}\right)_{c=0.5}\right\},$$

and wherein *h(s)* is a modified cubic kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 19 (previously presented): The method according to claim 15, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claim 20. (Currently Amended) A computer readable medium for storing a program for an apparatus which processes data, said processing comprising a method of interpolating image data, said program comprising:

code for accessing a first set of discrete sample values of the image data;

code for identifying text and ~~and edge~~ regions in the first set of discrete sample values depending on ~~an edge strength indicator, an edge direction indicator and~~ a local contrast indicator associated with each of the discrete sample values of the first set;

code for identifying edge regions in the first set of discrete sample values depending on an edge strength indicator and an edge direction indicator for each of the discrete sample values of the first set;

code for combining the text regions and the edge regions to form a kernel selection map;

code for cleaning the kernel selection map by re-assigning orientations of any ~~re-orientating the~~ edge regions having isolated edge directions occurring in an otherwise uniformly directed local region of the first set of discrete sample values, according to ~~an underlying edge~~ the uniform direction;

code for calculating kernel values for each of the discrete sample values using one of a plurality of kernels, wherein the one kernel is selected from the plurality of kernels using the cleaned kernel selection map; and

code for convolving the kernel values with the discrete sample values to provide a second set of discrete sample values.

Claim 21 (previously presented): The computer readable medium according to claim 20, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 22 (previously presented): The computer readable medium according to claim 20, wherein the plurality of kernels are given by:

$$h(s_x, s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\right)_{c=0.5} \cdot h\left(((2\theta/\pi)s_x + 2\theta/\pi - 1)s_y)w(\theta)\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi - 1)s_x + (2\theta/\pi - 2)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi - 2)s_x + (1-2\theta/\pi)s_y)w(\theta))_{c=0}\right\}$$

,

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 23 (previously presented): The computer readable medium according to claim 20, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\dfrac{s-d}{1-2d}\right|^3 - 3\left|\dfrac{s-d}{1-2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=0} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein *h(s)* is a modified cubic kernel, $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and $\underline{\bullet}$ indicates matrix multiplication.

Claim 24 (previously presented): The computer readable medium according to claim 20, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claims 25-104 (canceled)